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is of greater functional importance than the corresponding tooth in the American form.

From the illustrations of *Amphicyon lemanensis* by Filhol[2] it is seen that the occipital condyles of that form are less sessile, the mastoid process is of larger size, and the tympanic bullæ were probably smaller. It is also seen (Pl. XI., figs. 4, 6–8) that M^3 has three roots and the crown is occupied by three distinct cusps, a distinctly more conservative character, and properly to be considered as more primitive than that of the reduced and comparatively simple crowned M^3 of *Daphœnodon superbus*. Another character which seems to indicate less specialization in the European genus is the short antero-posterior diameter of M_1, when compared with that of *Daphœnodon superbus*.

It is further seen on comparison that the skull of *Daphœnodon superbus* is less elongated than that of *Daphœnus felinus* from the American Oligocene. The base of the skull back of the pterygoids is especially shortened. The muzzle is heavier. The incisors are larger, the antero-internal tubercle of P^4 (carnassial) is less developed, M^1 and M^2 are more developed internally, and the postero-internal angles of M_1 and M_2 are more prominent. The position of P^4 is less oblique in the alveolar border than is the case with the corresponding tooth in *Daphœnus felinus*, a character tending toward conditions found in the recent dogs.

The limbs of *Daphœnodon superbus* are comparatively long and slender, the thoracic region rather light, and the tail is very long. These are characteristic structural features of *Daphœnus felinus* described by Mr. Hatcher in the *Memoirs of the Carnegie Museum*, Vol. I., pp. 66–95.

O. A. PETERSON

CARNEGIE MUSEUM,
March 20, 1909

NOTES ON MUSHROOM SPORES

IN making experiments to determine if the spores of dung-inhabiting mucors pass through the stomach and intestines of animals before they germinate, an interesting fact about the spores of mushrooms was discovered.

Some fresh horse manure, immediately after it was voided, was placed upon a sterilized plate and covered with a sterilized glass cover. On examining parts of this manure for mucor spores, there were found spores resembling mushroom spores. The plate was then set aside for three weeks when an abundant crop of mushrooms appeared. Examination proved them to be *Coprinus ephemerus* Fries.

There is a possibility that the spores might have been floating in the air and might have fallen upon the manure in the short time that it was exposed in the stable but it is not very probable that such was the case.

It seems practically demonstrated that these spores passed through the digestive tract of the horse and escaped any injurious effect from the process of digestion. They germinated and developed into mature plants in a very short time.

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TANKS FOR SOIL INVESTIGATION AT CORNELL UNIVERSITY

THERE are certain experiments involving fundamental problems in soil productiveness that can be conducted only where it is possible to accurately measure the conditions as they exist in the field, and to maintain the records through a great number of years. Some of these problems are as follows:

Effects of the continuous use of large amounts of mineral fertilizers upon the physical and chemical properties of the soil, and upon the bacterial flora and bacterial activity.

Changes that occur in a series of years when soils gradually deteriorate or improve.

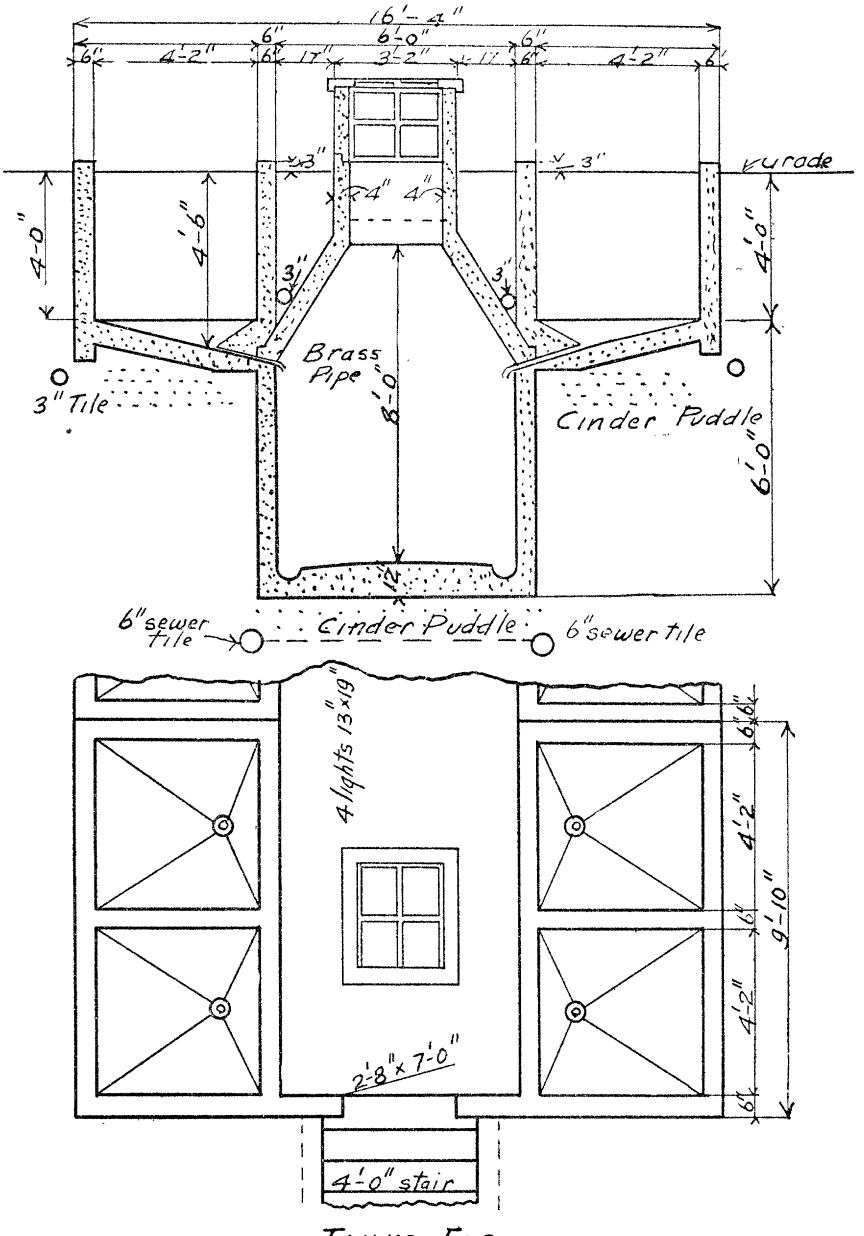
Effect of different methods of soil treatment upon the loss of lime in the drainage water.

The loss of potassium and other substances occasioned by manuring with lime.

Loss of soluble salts caused by clean cultivation.

Extent to which soils under field conditions

[2] *L. c.*, Pl. XIII., Fig. 5.



TANKS FOR
SOIL INVESTIGATION
CORNELL UNIVERSITY
Scale 1/4" = 1'-0"

are renewed by accession of lower soil to the plowed portion.

For the purpose of conducting investigations of this kind there have been built on the farm at Cornell University a number of large tanks in which soil may be kept at the same surface level, and under conditions nearly identical with that of the surrounding soil, upon which duplicate tests are made. They are intended to furnish receptacles for bodies of soil of sufficient size to produce plants in a normal manner under approximately field conditions, and yet afford opportunity for measuring a large number of the factors affecting plant growth. The construction is of concrete, but the tanks will be lined.

Each tank is four feet two inches square with a maximum vertical depth of four feet six inches and a minimum depth of four feet. There are twenty-four tanks placed in two rows of twelve tanks each. Between the rows of tanks is a tunnel, the bottom of which is ten feet below the top of the tanks. The tunnel is six feet wide. From the lowest point in each tank is an outlet tube two inches in diameter and tin lined. It is made large enough to permit of easy cleaning and has no bends in it. A piston runs through the tube to within four inches of the upper end. Between the perforated head of the piston and the soil, glass wool is to be inserted. The piston can be withdrawn if it is desired to clean the tube.

Drainage water from each tank will be caught in a receptacle in the tunnel. The lining in the tanks will prevent any soluble material in the concrete from appearing in the drainage water. A constant water table at any desired depth may be maintained by raising the rubber tube leading from the outlet tube to a corresponding point below the surface of the soil in the tank.

The tanks, as described, will each contain between three and four tons of soil, and the surface will constitute approximately .0004 of an acre. They are built with special reference to durability so that it will be possible to plan for experiments to extend over a long period. The quantity of soil contained is not too large to allow of accuracy in sampling and yet is sufficiently large to closely resemble field conditions, which is not true of the quantity contained in pots. No covering is to be placed over the tanks, but in every way natural conditions are to be permitted. The top soil and subsoil will be placed in their relative positions. It is expected that the rainfall will be sufficient to meet the needs of the crops, but if the plants suffer during periods of drought they can be watered artificially.

Any desired type of soil may be used which is not possible with ordinary field experiments. It is also possible to make a comparison of different soil types under any desired condition which may be very serviceable in ascertaining the effect of those properties differentiating these types upon certain factors in soil productiveness.

The chief feature of the plan is that of keeping accurate records of the factors affecting plant growth without producing artificial conditions.

The tube leading from the bottom of the tank is designed to carry off the drainage water into a receptacle which will permit the quantity to be measured and its constituents to be determined.

The accompanying diagram shows the plan and cross-section of these tanks.

T. L. LYON

THE GEOLOGICAL SOCIETY OF AMERICA

THE twenty-first annual meeting of the Geological Society of America was held under the presidency of Professor Samuel Calvin, of Iowa City, Iowa, in the rooms of the geological department, Johns Hopkins University, Baltimore, Tuesday, Wednesday and Thursday, December 29, 30 and 31, 1908.

The first session of the meeting was called to order at ten o'clock Tuesday morning with President Calvin in the chair and the society was cordially welcomed to Baltimore by Professor W. B. Clark in a few well-chosen remarks, to which appropriate response was made by President Calvin.

The secretary, Dr. E. O. Hovey, of the American Museum of Natural History, reported that the printed list of fellows contained 294 names, the